

FINANCIAL DEVELOPMENT AND ALLOCATION OF EXTERNAL FINANCE

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Financial Development and Allocation of External Finance*

Jan Bena[†] Peter Ondko[‡]

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Abstract

We examine whether financial systems facilitate efficient allocation of resources into perspective projects. Employing European micro-level data from 1996-2005, we show that firms in industries with the best growth opportunities use more external finance in financially more developed countries. The result is robust to controlling for technology determinants of external finance and to choosing different proxies for growth opportunities. We also find that the explanatory power of the technology determinants decreases significantly once growth opportunities are controlled for, which suggests that the often used measures of determinants of external finance are partly driven by growth opportunities.

Abstrakt

Táto práca skúma schopnosť finančných systémov efektívne alokovať zdroje na perspektívne projekty. S použitím dát pokrývajúcich Európske firmy za obdobie 1996 až 2005 sme ukázali, že firmy v odvetviach s najlepšimi rastovými príležitosťami používajú viac externých finančných zdrojov v krajinách s rozvinutými finančnými trhmi. Tento výsledok je robustný na zahrnutie technologických determinantov použitia externých financií a na alternatívne spôsoby merania rastových príležitostí. Ďalej sme zistili, že vysvetľovacia schopnosť technologických determinantov použitia externých financií významne poklesne ak model zahŕňa aj mieru rastových príležitostí, čo implikuje, že často používané miery determinantov použitia externých financií sú čiastočne vysvetlené rastovými príležitosťami.

Keywords: financial development, external finance, allocative efficiency

JEL classification: F3, O16, G3

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1 Introduction

The key role of a financial system is to acquire information about investment opportunities and facilitate efficient allocation of resources into viable projects.¹ Recent empirical work uses aggregate data to present indirect evidence of the positive capital allocation function of more developed financial markets. Wurgler (2000) estimates the effect of financial development on the elasticity of aggregate investment with respect to growth opportunities. Fisman and Love (2004) measure the effect of financial development on growth of industries with positive opportunities.²

The key process behind the ability of financial systems to allocate capital efficiently is the competence to identify firms with positive growth opportunities and channel external finance towards these firms. In this paper, we employ micro-level data to test the hypothesis of the improved capital allocation function of more developed financial markets directly on individual firms. Specifically, we ask whether firms operating in industries with positive growth shocks are more able to respond to the new opportunities by increasing their external financing in countries with higher levels of financial market development. Analyzing external finance use of individual firms instead of (industry) growth or investment rates yields a more precise test of the capital allocation efficiency hypothesis. First, we do not need to make any assumptions about how efficiently is a dollar of external finance utilized inside a firm to deliver growth. In other words, we focus on the amount of dollars raised rather than on the ultimate outcome. Second, we do not aim to explain the entire corporate investment, but only the part that is financed using external funds. If external finance is more costly than internal, firms will turn to financial markets only after they have exhausted their own resources. We explain to which extent their external finance need is satisfied by financial markets of different depth and institutional quality.

¹See survey by Levine (2005) for a summary of financial systems' functions.

²We discuss how our study fits into this literature in detail in Section 2.

Using a large cross-section of manufacturing firms from European countries we find that financial development improves the allocation of capital by channeling external finance to firms that operate in industries with high growth prospects. This result is robust to using two alternative proxies for the global component of industry growth opportunities: (i) industry value-added growth in the US and (ii) the change in the global industry PE ratios. Both proxies are based on the assumption that there exists a global component in the industry specific growth opportunities caused by demand and productivity shifts. For this reason, we focus our analysis on the manufacturing sector of a homogenous set of European countries with highly synchronized product markets and regulation where the key underlying assumption of global shocks to industry growth is arguably most likely to hold. When we proxy growth opportunities by the growth of US industries, the additional assumption is that firms in the most financially developed countries, such as the US, are financially relatively unconstrained and are able to materialize growth opportunities they encounter. When we proxy growth opportunities by the global industry PE ratios, we assume that financial markets are integrated to the extent that the common component of growth opportunities is priced in global industry portfolios.

Despite relying on different assumptions, both proxies yield estimates of similar economic significance. For example, if Bulgaria's banking sector were as developed as the one in Netherlands, the otherwise comparable firms that operate in an industry ranked at the 75th percentile by US growth would use 0.6 percentage points (on average per annum) more external finance in proportion to their total assets relative to the firms that operate in an industry ranked at 25th percentile. When we approximate growth opportunities by global PE growth, we obtain the analogous estimate of 0.4 percentage points.³ The effect is more than 4 times larger if we instrument to correct for measurement error in growth counterfactuals.

We also contribute to the literature on finance-growth nexus. This literature is founded

³The sample mean of external finance use is 0.6 percent and its standard deviation is 3.8 percent.

on the argument that technology employed by firms is constant across countries and determines industry-specific external finance dependence (Rajan and Zingales, 1998). We show that the ability to provide external finance (EF) to firms in industries with the best opportunities still holds when we control for technology determinants of EF interacted with financial development. Interestingly, we find that the importance of technological determinants of EF use decreases by about 10 to 50% once growth opportunities are included in our regressions, and this is most pronounced when including a US value-added growth proxy. This suggests that the widely used measures of technological determinants of EF dependence are partly driven by growth opportunities that were financed and hence realized in countries with high financial development (such as the US).

The structure of the paper is as follows: Section 2 relates our approach to the literature, Section 3 presents the methodology, and Section 4 contains the data description. Section 5 presents the results together with robustness checks, while Section 6 summarizes our findings.

2 Related Literature

Theoretical models based on adverse selection or moral hazard imply that financial development improves screening of investment projects and/or enhances monitoring by external investors, which in turn leads to more efficient allocation of capital to investment projects.⁴ This section summarizes the empirical literature that tests this broad prediction.

In his seminal paper, Wurgler (2000) estimates the country-specific elasticities of investment to value added in order to capture the country differences in the extent to which investment increases in growing industries and decreases in declining industries. He shows that the elasticity tends to be larger in countries with larger credit markets,

⁴See for example Boyd and Prescott (1986) for adverse selection and Townsend (1979) for moral hazard arguments.

more informative stock prices, less state-ownership of firms, and greater protection of minority investors. This important result suggests a causal link from financial development to more efficient reallocation of capital. Wurgler (2000) uses industry-level gross fixed capital formation as the dependent variable as his focus is on the aggregate impact of financial system development. In our analysis, instead, we investigate the process of capital allocation directly at the micro-level and we show that firms with better growth prospects receive more external finance in more developed financial systems.

Wurgler (2000) uses realized industry-country level value added growth as a proxy for industry growth opportunities. He shows that this proxy can be justified as it is significantly positively correlated with more traditional measures of growth opportunities: average Tobin's Q , price-to-earnings (PE) ratio, and sales growth. Indeed, in a country with a perfectly developed financial market, realized growth is aligned with demand and productivity shocks and hence reflects growth opportunities. Also, if latent industry growth opportunities are positively autocorrelated, it is possible to use current realized growth to approximate future growth opportunities. However, it is less clear whether potential-to-realized growth correspondence holds in countries where opportunities anticipated in the past are not reflected in current growth due to financial or labor market frictions. Therefore, we use realized growth in the US (a country with high financial market development and low frictions) and price-to-earnings ratios of global industry portfolios as proxies for industry-level growth opportunities.

The reasons for choosing US growth as a measure of latent global growth opportunities are similar to Fisman and Love (2007) and Ciccone and Papaioannou (2006), who test whether investment opportunities caused by global demand and productivity shifts lead to higher growth in financially more developed countries.⁵ Unlike these two papers, we focus our analysis on manufacturing sectors of a homogenous set of European

⁵Ciccone and Papaioannou (2006) further recognize that relying on country-specific growth measures may lead to spurious conclusions due to measurement error and the possibility of systematic correlation of the country-specific component of growth opportunities with financial development.

countries on a comparable level of economic development and with highly synchronized product markets where the key underlying assumption of global shocks to industry growth is arguably most likely to hold.

Alternatively, to capture the global component of growth opportunities, we use price-to-earnings (PE) ratios of world-wide industry portfolios. In contrast to the realized US industry growth, global industry PE ratios are forward-looking, based on ex-ante expectations of future growth. A high PE ratio means that investors are willing to pay a high multiple of current earnings for stocks in a given industry, which happens if they expect dividend growth.

Bekaert et al. (2007) show that under the market integration hypothesis, the global component of growth opportunities of a given industry should be competitively priced on global stock markets and reflected in the global industry's PE ratio. As a result, a country with a large share of industries with high global PE ratios should grow faster than the world economy. On the other hand, the local industry PE ratios would add information about the country's future growth only if markets are not fully integrated and the opportunities are priced locally rather than globally. The authors provide evidence in support of the hypothesis of market integration by showing that a country's industry-weighted global PE ratios predict future real GDP growth, while the industry-weighted difference of local and global PE ratios doesn't have any predictive power for relative economic growth. Importantly, their analysis suggests that the PE ratio of a global industry portfolio is a valid exogenous measure of growth opportunities as it does not use local price information that could be potentially contaminated by the local level of financial development.⁶

Our finding that firms with positive growth prospects receive more external finance in financially more developed countries directly verifies that financial development al-

⁶As all European countries in our sample have their stock and banking sectors liberalized in our sample period, we do not formally test for market integration in our sample and rely on the result of Bekaert et al. (2007).

leviates credit constraints. This result relates our work to firm-level structural investment model studies. Here, the optimal investment decision follows the Euler equation that trades off marginal benefits of investing today with discounted marginal costs of postponing investment to the next period. In the absence of financial constraints, the only relevant factor affecting a firm's investment decision is a project's growth potential. However, one would observe positive elasticity of investments to cash-flow if firms experience difficulties in obtaining external finance. Love (2003) and Islam and Mozumdar (2007) show that this elasticity is decreasing with financial development, which indirectly suggests a positive role of financial development in alleviating credit constraints.

Alternative tests of the role of financial system in the improvement of allocative efficiency are based on the neoclassical argument that capital should be allocated such that its marginal product is equalized across projects. This insight underlies two studies that investigate the impact of financial liberalization on capital allocation. Galindo et al. (2007) argue that a suitable approximation for marginal product of capital is either the sales to capital ratio (appropriate in the case of the Cobb-Douglas production function) or the ratio of operating profit to capital (valid under constant returns-to-scale production technology and perfect competition in output markets). They use firm-level panel data for 12 countries to create proxies for marginal product of capital and construct the efficiency index of capital allocation. Using the index, they show that efficiency increases in periods following financial liberalization. Abiad et al. (2008) approximates the expected marginal product of capital by the market-to-book ratio of publicly listed firms, the empirical equivalent of Tobin's Q . Next, he follows a difference-in-differences methodology to assess whether the dispersion in Q s decreases in the period following liberalization. The advantage of both studies is that they aim to test simple predictions of neoclassical theory. On the other hand, the assumptions needed to form empirical proxies for the theoretical concepts are rather strong. In this respect, we complement these neoclassical approaches by avoiding an empirical approximation of marginal product of

capital and focusing instead on the degree of alignment between growth opportunities and external finance use.

3 Methodology

We test the hypothesis that financial development improves efficiency of capital allocation by channeling external finance towards firms in industries with the best investment opportunities. Our regression specification is

$$EFU_{fic} = \alpha + \beta FD_c * GO_i + \sum_i \lambda_i D_i + \sum_c \lambda_c D_c + \gamma X_{fic} + \varepsilon_{fic}, \quad (1)$$

where EFU_{fic} is the period-average external finance use of firm f from industry i and country c over the period 1996-2005. FD_c denotes the country-level indicator of financial development measured as of the beginning of our sample period. GO_i proxies global industry growth opportunities. D_i and D_c are industry and country fixed effects, respectively. X_{fic} is a vector of firm-level control variables.

External finance use (EFU) is computed as the sum of annual change in a shareholder's equity and change in non-current liabilities (long term debt and other non-current liabilities⁷) divided by the total assets. In other words, as EFU is the difference between issuance and repayments, it captures the net increase in the use of external finance. In the appendix we show that the numerator of EFU is the balance sheet approximation of the numerator of the external finance dependence measure used by Rajan and Zingales (1998). While Rajan and Zingales (1998) use capital expenditures in the denominator, we use total assets to scale the flow of external finance. The reason is technical. Capital expenditure is a flow measure and as such it can take values very close to zero.⁸ Rajan and Zingales (1998) use the value of external finance dependence of the

⁷Other non-current liabilities comprise of liabilities with maturity longer than 1 year such as retirement benefit obligations, deferred tax liabilities, provisions, trade debts after one year and other amounts payable.

⁸Nilsen and Schiantarelli (2003) show that around 30% of Norwegian plants and 6% of firms have zero

industry median firm to characterize industry specific external finance dependence and, thus, they implicitly assume that capital expenditures of the median firm are positive. On the other hand, in the context of our firm-level regression with external finance use on the left-hand side, scaling by a factor that takes values close to zero would lead to excessive outliers. A measure of external financing analogous to ours has been used in firm-level panel setting in Baker et al. (2003). The summary statistics for EFU are given in Table 1. The median and the mean EFU in the sample are close to zero. This is consistent with the fact that issuance and repayments of debt and equity should be balanced on average.

To proxy for growth opportunities GO_i , we use the period-average growth rates of industries in the US. Alternatively, we use PE ratios of global industry portfolios. As there are no clear predictions whether it is the level of PE ratios or the change in the level of PE ratios that capture growth opportunities better, we use period-averages of both. As our dependent variable measures the average net additions to external finance used by a firm, a change in the level of PE ratios seems more appropriate. In the case of a balanced panel, GO_i are computed over the whole period and are applied to all firm observations. As our panel is unbalanced, the period over which we compute the average external finance use is different across firms. To mitigate the measurement error in capturing growth opportunities, we adjust the period used to compute the growth opportunities counterfactual for every firm to match the period over which external finance is computed.

In all our specifications, we control for a set of firm-level variables, measured as of the first year a firm enters the sample. This is to eliminate the initial differences in the within-industry distributions of firms along characteristics that have potentially different effect on the use of external finance. Effectively, we are thus able to compare differences in external finance use of highly comparable firms operating in environments with varying financial development and facing different growth opportunities. The set of

investment in an average year.

firm-level characteristics included in our regression specification contains age, a dummy for being publicly listed, stock of cash and measures of the firm's leverage, asset tangibility, and size. Finally, we include the full set of industry and country dummies into our specification to control for unobservable industry and country-level factors affecting EFU.

Rajan and Zingales (1998) examine the impact of financial development on growth by investigating whether firms/industries with higher need for external finance grow faster in financially more developed countries. Presumably, the underlying mechanism behind this result is that financial development relaxes financial constraints, which matters the most for those firms that are highly dependent on external finance due to reasons related to technology specific to their type of business. Using our measure of external finance use, we are ready to directly test this mechanism. We estimate

$$EFU_{fic} = \alpha + \beta FD_c * Technology_i + \sum_i \lambda_i D_i + \sum_c \lambda_c D_c + \gamma X_{fic} + \varepsilon_{fic}, \quad (2)$$

where $Technology_i$ denotes industry-specific technological determinant of external finance use.

We consider three candidates for technological determinants. The first is external finance dependence (EFD), measured as in Rajan and Zingales (1998). This is an all-encompassing measure of demand for external finance which is based on the assumption that in highly developed financial markets such as the US, industry differences in the observed proportion of capital expenditures financed from external sources reflect underlying technological differences among industries.

In choosing the other two technological factors, we follow Ilyina and Samaniego (2008) who suggest R&D Intensity and Investment Lumpiness as technologically deeper determinants of external finance need. The R&D Intensity is approximated by the average share of R&D expenditures on capital expenditures of a median firm in the US industry. Firms operating in R&D intensive sectors may be in greater need for exter-

nal finance, because R&D investments are often relatively large at the startup of firms or projects and they may be associated with longer gestation periods as it is likely that profits from R&D projects materialize later.

Lastly, Investment Lumpiness is a proxy for the degree of mismatch between cash inflows and cash outflows. Firms that experience large cash-flow mismatches are more likely to seek outside financing due to a shortage of internal resources. One reason for the existence of cash-flow misalignment are investment "spikes," which are periods in which capital expenditures exceeds their usual levels. Doms and Dunne (1998) show that more than half of 12,000 US manufacturing plants in their sample experience a year in which capital stock increases by over 35% and often the spikes occur in consecutive years. From the perspective of a structural investment model, this empirical pattern suggests the existence of important non-convexities in the adjustment costs. Assuming these non-convexities are driven by industry-specific technological factors, we calculate Investment Lumpiness as the average number of investment "spikes" in relatively frictionless US industries over a given period.

The proxies for technological determinants of finance are calculated on US data over the period under investigation, and thus they may as well be capturing underlying growth opportunity shocks specific to that period. To verify this we estimate specifications where we interact financial development with growth opportunities as well as with technological proxies:

$$\begin{aligned}
 EFU_{fic} = & \alpha + \beta_1 FD_c * GO_i + \beta_2 FD_c * Technology_i \\
 & + \sum_i \lambda_i D_i + \sum_c \lambda_c D_c + \gamma X_{fic} + \varepsilon_{fic}.
 \end{aligned} \tag{3}$$

If technology proxies are significantly contaminated by the growth opportunity shocks, we would expect β_2 to be smaller than their counterparts in specification 2. The magnitude of this decrease should be larger when GO_i is approximated by US Growth because

it controls for US specific shocks which are absent in the global PE growth proxy. We expect β_1 to be unaffected by controlling for technological factors and to keep the magnitude estimated in specification 1.

4 Data

4.1 Firm-level Data

Firm-level panel data are obtained from Amadeus (Analyse MAJOR Databases from European Sources), which contains balance sheet and income statement information for a large population of public and private firms spanning all of Europe. We use the ‘TOP 200 thousand’ version of this database, which contains a subsample of the largest firms. Specifically, for a firm to be included in this module, at least one of the following criteria must be met: For UK, Germany, France and Italy, an operating revenue at least 15 mil. EUR, total assets at least 30 mil. EUR or number of employees at least 150. For all other countries, operating revenue at least 10 mil. EUR, total assets at least 20 mil EUR, or the number of employees at least 100.

The firm coverage is incomplete before 1996 and after 2005, and therefore we use only observations from 1996-2005. We exclude Romania from the sample due to large inconsistencies in the accounting data of its firms. Denmark and Norway have only few firms in the final sample and have been dropped too.

Our data-cleaning procedure is in line with the previous research utilizing this database. First, as in Bena and Jurajda (2007), in order to decrease the noise in average external finance use, we drop all firms for which less than 5 yearly observations of external finance use is available. As Klapper et al. (2006), we exclude firms with consolidated financial statements to avoid double counting. Further, we exclude firm-years with very small total assets (less than 1000 EUR), very high leverage (long-term debt more than double the total assets), and very large profit/loss (absolute value more than ten times the total

assets). Additionally, we drop the bottom and top percentile of relative yearly changes in total assets in order to avoid the influence of extreme events such as mergers, acquisitions or spinoffs. We deflate all financial variables by the producer price index defined over year-country-industry triple, where industry is defined by the ISIC 2-digit. Lastly, to minimize the impact of long tails of firm size and age distributions, we exclude firms in the top percentile of the distribution by total assets, age and employment measured as of the first year the firm appears in the sample.

4.2 Industry-level Data

The value-added data for US used to compute our first proxy for growth opportunities are taken from OECD STAN database downloaded in 2009. We use the index of volume of value-added (VALK) for industries on the 2-digit level of ISIC rev 3.1. In some cases the volume index of value added and corresponding value-added deflator is available only for a group of two or three industries.⁹ In these instances we use the corresponding group deflator (VALP) to adjust nominal value-added (VALU), which is available for all industries.¹⁰

The data for the monthly series of global PE ratios are obtained from Datastream. As of March 2008, Datastream uses Industry Classification Benchmark (ICB) created by FTSE Group and Dow Jones Indexes to classify companies into 114 sub-sectors. Following the approach of Bekaert et al. (2007), we link ICB sub-sectors into 22 manufacturing 2-digit ISIC industries.¹¹ Whenever more than one ICB sub-sector is linked to a given 2-digit ISIC industry, we calculate the weighted average of the PE ratios of entering sub-sectors using their market values as weights. Finally, for every industry, we compute yearly values of the PE ratios by taking the simple mean for all months in a given year.

⁹Specifically these ISIC 2-digit categories: 15-16, 17-19, 32-33

¹⁰For categories 36 - Manufacturing n.e.c. and 37 - Recycling, neither volume nor nominal value-added data is available.

¹¹We obtained the concordance table used in Bekaert et al. (2007) from the authors. However, the ICB classification has been expanded since their work. Moreover, Bekaert et al. (2007) link ICB sub-sectors to SIC industries, while we need to link them to ISIC classification.

The correspondence table is available upon request.

Following Rajan and Zingales (1998) and Ilyina and Samaniego (2008) we use Compustat to compute industry-level technological determinants of the need and ability to raise external finance. Instead of using values tabulated in these papers, we re-calculate proxies for ISIC rev. 3.1 industry classification in order to be able to match them with the Amadeus data.¹² In line with Rajan and Zingales (1998), we compute US Dependence on External Finance as the share of capital expenditures not financed by the cash-flow from operations. Capital expenditures is item 128 in Compustat and cash-flow from operations is defined as cash-flow from operations (item 110 or sum of items 123, 125, 126, 106, 213 and 217 if unavailable) plus change in payables (item 70 or 304 if unavailable) minus change in receivables (item 2 or 302 if unavailable) plus change in inventories (item 3 or 303 if unavailable). We sum both capital expenditures and cash-flow from operations over the 1996-2005 period for each firm and compute firm-level dependence. Industry level external finance dependence is then dependence of the median firm.

Following Ilyina and Samaniego (2008), we compute US R&D intensity as the share of R&D expenditures (item 46) in capital expenditures. We sum both the nominator and denominator over the 1996-2005 period for each firm and compute firm-level R&D intensity. Again, each industry is characterized by a median firm.

US Investment Lumpiness is also computed as in Ilyina and Samaniego (2008). It is computed as the average number of investment spikes experienced by firms in a given industry over the 1996-2005 period, where an investment spike is defined as annual capital expenditure in excess of 30% of the firm's fixed assets (item 8).

The summary statistics for industry-level proxies for growth opportunities and technological determinants of external finance are presented in Table 3 and their rank correlations are presented in Tables 4. Rank correlations of the average change of global PE ratios with technological determinants of external finance is significantly lower than

¹²We use concordance from the US census to link NAICS 2002 classification used in Compustat to 3-digit ISIC industries.

comparable statistics for real value-added growth in the US, which suggests that US growth as well as technological measures are partially driven by same underlying shocks.

4.3 Country-level Indicators of Financial Development

We use country-level measures of financial development in order to make our results comparable with the literature. We use three traditional measures of depth of credit and stock markets, specifically private credit by deposit banks and other financial institutions to GDP, stock market capitalization to GDP and stock market total value traded to GDP. These data are taken from the 2006 version of World Bank's Financial Structure and Economic Development Database described in detail in Beck et al. (2000).

We complement measures of financial depth by a proxy for the institutional quality of financial markets as measured by the Accounting Standards index. It rates annual reports of companies in 1990 according to the inclusion of 90 items in their balance sheets and as such it is an indicator of the quality of accounting standards. The index is produced by International Accounting and Auditing Trends (Center for International Financial Analysis and Research, Inc.) and it ranges from 0 to 90. We scale it down by 100 before using it in regressions.

Table 2 presents summary statistics for financial development indicators. The cross-country standard deviation is of the same order as the mean for all volume-of-financial-activity measures, which suggests substantial variation in financial development as of 1996. The variation in Accounting Standards is smaller, which is most likely caused by the lack of this data for Ireland and all countries of Central and Eastern Europe in our sample.

5 Results

We present basic estimates of our main specification of equation 1 in Table 5. We report coefficients on selected regressors from regressions of the time average of annual firm-level External Finance Use of manufacturing firms operating in the period 1996-2005 on the interaction of country-level indicators of financial development and proxies for growth opportunities of 2-digit ISIC industries. In all specifications we control for 3-digit ISIC industry and country dummies and firm-level control variables that are measured as of the first year a firm enters the sample. Specifically, for each firm we include its leverage, tangibility, collateralization, age, the number of employees, total assets, stock of cash holdings and the indicator for being publicly quoted.

The estimates in Table 5 suggest that financial development improves allocation of external finance by channeling it to industries with high growth prospects. To inspect the economic significance of our estimates we consider the effect of financial development in increasing average use of external finance for firms operating in industries at the bottom and top quartile of the industry distribution by the real value-added growth in the US. Thus, using our estimated coefficients of the interaction terms $\hat{\beta}$, we compute

$$\hat{\beta} * (FD_{max} - FD_{min}) * (USGrowth_{75p} - USGrowth_{25p}), \quad (4)$$

where FD_{max} and FD_{min} are the sample maximum and minimum of the indicator of financial development and $USGrowth_{75p}$ and $USGrowth_{25p}$ are the sample top and bottom quartiles of the real value-added growth in US, its difference being 3.3% in the sample. The impact of the increase of Total Capitalization from its sample minimum to its sample maximum on the allocation of external finance use is then 0.36 percentage points. Thus, the difference in External Finance Use between firms operating in the industries ranked at 75th and 25th percentiles of US real value-added growth will be 0.36 percentage points higher in Netherlands than in Latvia, the countries with highest and lowest

Total Capitalization in our sample, respectively. Using indicators of Private Credit, Market Capitalization, Market Value Traded and Accounting Standards we obtain economic effects of 0.56, 0.16, 0.31 and 0.13 percentage points respectively. For the comparison, the sample mean and standard deviation of External Finance Use are 0.4% and 3.8%, respectively. The economic significance of the financial development on the allocation of external finance may appear low, however several comments are worth noting. First, by approximating only for the industry-specific component of growth opportunities we are very restrictive. On the one hand, we alleviate endogeneity concerns but on the other we introduce measurement error which can lead to the attenuation bias. Second, we characterize each firm by the time-average of its external finance use. While this allows us to investigate the allocation of external finance across-industries over a longer period, it creates the problem of averaging net external finance to zero. We would expect firms to obtain external finance in periods of positive shocks and pay it back when returns from investments are realized, which would show as negative autocorrelation in time series of external finance use with the implication of the time average converging to zero with the length of time period.

In Panel A of Table 6, we complement estimates from Table 5, obtained using real value-added Growth of US industries as a proxy for growth opportunities, with the estimates obtained using the time-average of the level and growth in Global PE ratios as alternative proxies. We include both average level and growth in Global PE ratios to investigate whether financial development improves channeling of external finances to industries with high expectations of future growth (high level of PE ratio) or to industries in which the growth prospects increase rapidly over the investigated period (high growth of PE ratio). The results are striking; financial development makes no difference in allocating external finance to industries which differ in their average level of expected growth opportunities. On the other hand, our results suggest that financial development helps to facilitate financing of industries with growing market expectations as measured by the

growth of Global PE ratios. Thus, we will choose Global PE Growth to be the alternative proxy for growth opportunities. The economic significance of estimates obtained with Global PE Growth is comparable to the case of US Growth. Specifically, the term from equation 4 is calculated as 0.4, 0.41, 0.35, 0.27, and 0.08 percentage points if financial development is measured by Total Capitalization, Private Credit, Market Capitalization, Market Value Traded and Accounting Standards, respectively.

In panel B of Table 6 we present estimates obtained on the sub-sample of EU-15 countries. Excluding countries from Central and East Europe (CEE) is justified by two reasons. First, CEE countries were still in the process of transition to a market economy and the resulting resource reallocation has been affected by their country-specific factors of growth opportunities. Second, EU-15 countries engaged in the single product market in 1993, which presumably brought higher degree of similarity in the growth opportunities of firms operating in the same industry across different countries. Our results show that leaving out CEE countries slightly increases estimates of the coefficients of interest, irrespective of growth opportunities proxy, which is in line with the hypothesis of better synchronization of economic shocks in EU-15.

5.1 Growth Opportunities and Technology

The extensive literature on finance-growth nexus uses the insight of Rajan and Zingales (1998) that the causal link from finance to growth can be identified by investigating the access to finance by industries differing in their natural external finance dependence. Ilyina and Samaniego (2008) further show that the strongest technological factors underlying cross-sectional variation in external finance dependence are R&D intensity and Investment Lumpiness. In line with these results, it is important to check whether industries dependent on external finance are actually using more of it in financially more developed countries. The results in Table 7 suggest that this is indeed the case. The coefficient on the interaction of financial development and the technological measure is

positive and significant in most cases, with the exception of Accounting Standards. Interestingly, interactions with R&D Intensity and Investment Lumpiness are statistically more significant in explaining improvements in the allocation of external finance caused by financial development than EFD. Again, the results are robust for the exclusion of non-EU-15 countries.

As discussed in Section 3, the differences in estimates of industrial technological determinants of dependence on external finance can be partially driven by the differences in growth opportunities over the period of their estimation. Specifically, the US specific component of growth opportunities may be the common factor driving the differences in the estimates of R&D Intensity, Investment Lumpiness, External Finance Dependence as well as realized Value-Added Growth. This would empirically translate into higher correlation between real growth of US industries and technological determinants of finance and the decrease in the coefficients on their interactions with financial development in the regressions on actual use of external finance. For the Global PE Growth proxy for growth opportunities, this should be less of a worry as the influence of the US growth component should be limited.

Tables 4 and 8 provide evidence in line with these hypotheses. In Table 4, the Spearman rank correlations between US Growth and technological determinants of finance are much higher than their counterparts for Global PE Growth. For example, the rank correlation of R&D intensity and US growth is 0.42 with p-value 0.06 while the correlation of R&D Intensity and Global PE Growth is only 0.06 with p-value 0.80. A similar result is obtained for Investment Lumpiness and EFD, although in the case of the latter, the correlation with Global PE Growth rises to 0.29.

The results in Table 8 are also in line with the hypothesis of the existence of a common factor of US growth opportunities in technological determinants. The estimated coefficients on interactions of financial development and R&D intensity and EFD drops to almost half once interactions with US Growth are included. However, we actually

observe a drop in the estimated coefficient on interaction of financial development with US Growth once corresponding interaction with Investment Lumpiness is included in the specification.

The picture is different when we use Global PE Growth as a proxy for growth opportunities (Panel B of Table 8). The estimated coefficients on the interaction terms of financial development with Global PE Growth are statistically significant and very similar in magnitudes to their counterparts in specifications which exclude technological interactions (Table 6). Furthermore, the interactions of financial development with technological determinants in the joint specification remain statistically significant and the magnitude of the drop in the coefficients is less severe and in case of Investment Lumpiness, the estimates actually increase when compared to single-term specifications (Table 7). Summed up, the evidence suggests that the role of financial development with respect to allocation of external financing is two-fold. On the one hand, it helps to channel external finance to industries which are presumably more dependent on it due to technological reasons. On the other hand, more developed financial markets are better in providing finance to industries with greater global growth opportunities.

5.2 Decomposing External Finance

In Appendix A, we show that our approximation of external finance use can be decomposed into the amount of equity raised/repurchased, the amount of long-term debt issued/repaid and the change in other non-current liabilities. As there exist major contractual and institutional differences among these components of external finance, it is important to assess what is the role of financial development in the improvement of their allocation with respect to growth opportunities. To do so, we run a set of regressions equivalent to specification 1 separately using each component of external finance use as a dependent variable. We present the results of this exercise in Table 9.

Panels A and B document that financial development improves the allocation of both

equity and long-term debt. When compared to the basic results in Table 6, the estimated coefficients on interaction terms suggest that around one third of the improvement in allocation of external finance comes in the form of shareholder's equity, while the remaining two-thirds can be explained by long-term debt and this pattern is roughly consistent for both proxies for growth opportunities and all measures of financial development, irrespective of being a proxy for the banking sector or stock market development. For proper interpretation of these results it is important to note that the balance-sheet data we use don't allow us to distinguish the identity of the external investor. For example, long-term debt would typically consist of bank loans; however, loans from other lenders as well as issued bonds also fall into this category. Thus, composition of this category may be affected by the development of the financial sector as well. In addition, the importance of equity in the improvement of allocation of external finance is magnified by the fact that our sample consists primarily of non-listed firms that are presumably less flexible in equity issuance/repurchase.

With respect to changes in other non-current liabilities, our results suggest that financial development makes no improvement in their alignment with growth opportunities. This result is in line with the expectations given that other non-current liabilities usually consists of items such as retirement benefit obligations, deferred tax liabilities, or long-term trade debts, and thus they are components of liabilities driven primarily by factors other than the need to finance growth opportunities.

5.3 Measurement Error

In our analysis, we use real US Growth and Global PE Growth in 2-digit ISIC industries as proxies for the global component of growth opportunities, which introduces measurement error to our analysis. The noise present in any proxy may lead us to underestimate the coefficient of interest due to classical measurement error bias. We investigate the magnitude of bias introduced by the measurement error in two ways. First, having

two different proxies for growth opportunities allows us to use two-stage least-squares (2SLS) approach to investigate the attenuation bias caused by measurement error. Under the assumption of the orthogonality of measurement errors in the two proxies for growth opportunities, we can use one as the instrument for the other, which allows us to use only the variation common to both of them to estimate the coefficient of interest. We use the interaction of financial development and global PE growth (US Growth) as the instrument for the interaction of financial development and US growth (global PE growth) and the results for both directions are presented in Table A.3. Compared to the basic estimates, there is a significant increase in the estimated coefficients for all measures of financial development. For example, the estimate of the coefficient on the interaction of total capitalization and global PE growth is more than 4 times higher in 2SLS than in the basic specification. In general, the order of increase of the estimates is between 2.3 to 7.5, which suggests that the impact of the measurement error may be large.¹³

Second, we use a simple version of simulation-extrapolation (SIMEX) method proposed by Cook and Stefanski (1994) to assess the magnitude of attenuation bias by comparing the estimates obtained by using the set of proxies created by adding white noise of varying precision to the base measure. Specifically, for each level of standard deviation ranging from 0.005 to 0.05, we simulate 100 draws from a multi-variate normal distribution and add them to both baseline proxies for growth opportunities. Newly created variables are then used as a proxy for growth opportunities in the interaction with the total capitalization in specification 1. Then, for each level of added noise, we compute the average of 100 obtained estimates and plot it against the standard deviation of added noise in Figure 2. The visual inspection of the plot allows us to evaluate the magnitude of the attenuation bias caused by the random error. Extrapolating back the relationship between standard error of added noise and the average estimate provides a naive guess

¹³Ciccone and Papaioannou (2006) carry out similar 2SLS exercise. In the industry-level growth regressions they instrument growth opportunities approximated by US growth with the world-average value-added growth by industry controlling for the effects of financial underdevelopment. They obtain an increase in coefficients of the magnitude ranging between 3 to 6.

of how the estimate would look like if the measurement error was less severe. For example, given that the standard deviation of the US Growth proxy is 0.033, then under the assumption that the measurement error is responsible for half of this variation, the quadratic extrapolation of the simulation results would suggest that the estimated coefficient would be approximately 0.042, which is around 50% larger than our basic estimate.

The results obtained from the 2SLS and SIMEX exercises suggest different levels of bias caused by measurement error. Naturally, we don't have any estimate of the proportion of variance of US growth or Global PE Growth caused by measurement error. However, Figure 2 suggests that even if the measurement noise accounted for a very large proportion in the variation of US Growth or Global PE Growth, the resulting attenuation bias is not likely to be of larger magnitude than 2, which is in contrast with the results obtained in the 2SLS exercise. A possible explanation for this discrepancy is a poor extrapolating performance of quadratic fit in the SIMEX exercise, or the existence of non-standard upward bias common to both proxies for growth opportunities, which would imply the violation of the assumption of the orthogonality of measurement errors in the 2SLS exercise.¹⁴

5.4 Robustness Checks

We check for the robustness of our results across several dimensions. First, as argued in Klapper et al. (2006), there exists substantial diversity in the legal forms of incorporation in Europe. The comparability of firms across countries can thus be increased by narrowing the sample to the forms of incorporation equivalent to limited and limited liability companies. In Panel A of Table A.2 we show that our results also hold for this narrow sample.

Second, in our difference-in-differences model, we regress firm-level external finance use on the industry-country group term that applies to all firms in the group. Effectively,

¹⁴An upward bias common to both proxies may arise if they both approximate growth opportunities more precisely in more financially developed countries.

we investigate conditional industry-country averages in external finance use and to the extent that the efficiency of this average is driven by the number of individual firms within each group, the potential concern is that our results may be affected by the industries with a small number of firms. In Panel B of Table A.2, we present the estimates of our basic specification on the sample constrained to industry-country groups with at least 20 firms. The estimates are qualitatively unaffected and the investigated effect is economically stronger.

Third, we account more carefully for the unbalanced nature of our panel. If industry-specific factors affecting external finance use have been changing rapidly over time, controlling only for industry fixed effects can be insufficient. Thus, we amend our baseline specification 1, by interacting industry fixed effects with period fixed effects. A period dummy is equal to 1 for a given firm if its external finance use is computed as an average over a given period. Our results are not affected (Panel C of Table A.2).

Fourth, we run median regressions which are robust to outliers and allow us to investigate industry-country median external finance use. The results are presented in Panel D of Table A.2 and the standard errors clustered on the industry-country level are bootstrapped. The conditional median effects are economically smaller and statistically insignificant, although in all cases they hold proper sign.¹⁵

Last, instead of industry value-added growth in the US, we use growth rates of industries in other OECD countries as proxies for unobserved growth opportunities. By doing so, we depart from the assumption that growth opportunities counterfactuals should be based on the growth experience of a country with a relatively frictionless financial system. On the other hand, using realized growth of industries in other countries allows us to check whether our main results aren't driven by the US specific growth shocks. Specifically, for a set of OECD countries, we run regressions equivalent to specifica-

¹⁵Additionally, our results are robust to excluding Bulgaria and the Netherlands, which are countries with the lowest and highest levels of financial development in our sample. These results are available upon request.

tion 1, where financial development is approximated by total capitalization and growth opportunities by industry value-added growth in a given OECD country. The results of this exercise are presented in Table A.4. Although, the set of estimated coefficients on the interaction term is diverse, all but one coefficient that are significant at the 10 percent level are positive. The exception is the negative and significant coefficient obtained using industry growth rates for Slovakia, which can be explained by the very specific development of the manufacturing sector in this transition country. All coefficients that are significant on 10 percent level are plot against the total capitalization of the country used as a growth opportunities benchmark in Figure 1. Financial development of a benchmark country seems to play a limited role in the size of the estimated coefficient of interest.

5.5 Alternative Measures of Financial Development

We check our results by investigating the effect of other dimensions of financial development on the allocation of external finance (Table A.5). First, we test the hypothesis that the higher the involvement of government in the banking sector, the lower the efficiency of allocation of finance to growing industries. To the extent that incentives of government as the owner of banks may not be fully in line with profit maximization, the government banks may be more distorted when allocating credit. Thus, we would expect that interaction of the government bank ownership and growth opportunities would be negative in the external finance use equation. We find that this is the case for both the level of government ownership and the level of government control in the top 10 banks in 1995 as calculated by La Porta et al. (2002).

Second, we investigate whether the operational efficiency of the banks and the level of competition in the banking sector increase allocative efficiency. To the extent the competition among banks increases the quality of the financial sector, it may comparatively improve the chance of obtaining credit for firms operating in industries with potential growth prospects. In line with Demirguc-Kunt et al. (2004), we approximate operational

efficiency and competitiveness of banking sector by the overhead costs and the net interest margin. The former reflects operational cost inefficiencies possibly associated with the market power while the later measures the mark-up between the interest received from borrowers and the interest paid to savers and thus it effectively approximates the degree of competition in traditional operations of the bank. Our findings suggest that higher mark-ups and cost inefficiencies are related to less efficient allocation of external finance.

Lastly, we use an all-encompassing market-based approximation of the country-level institutional quality, namely the control premium estimated by Dyck and Zingales (2004). The private control premiums correspond to the benefits enjoyed by the controlling shareholder and not shared by other shareholders. They arise as a consequence of the lack of limits to the extraction of private benefits, and they reflect the inverse of the level of investor protection in the country. Dyck and Zingales (2004) show that the control premiums are higher in countries with less deep financial markets, more concentrated ownership, less protected minority shareholders and weaker law enforcement. Our results are weakly in line with the hypothesis that low quality of institutions is related to lower allocative efficiency.

6 Conclusion

In this paper, we study the allocation function of the financial system. Using two alternative proxies for the global industry-specific component of growth opportunities, we show that comparable firms with positive growth opportunities are more likely to obtain external finance in countries with more developed financial markets. Given that our sample consists of relatively large and well-established firms which are shown to be less affected by financial development,¹⁶ it is likely that the economic significance of our result is even larger in the overall population.

¹⁶See Arellano et al. (2008) for recent evidence.

Our findings complement the existing literature which focuses on the implications of financial development on capital expenditures and growth. However, the most important role of financial system in the link from the growth opportunities through investment to growth is to provide external finance, a test of which is a primary question of our paper. In light of the outlined mechanism, we plan to complement our analysis by a second step in which we check whether the improved capital allocation function of more developed financial markets leads to higher corporate investment and growth precisely through more extensive use of external finance.

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Table 1: External Finance Use: Firm Data by Country, 1996-2005

Country	N	Mean	S.D.	Percentile		
				25th	50th	75th
Austria	143	-0.017	0.063	-0.058	-0.002	0.023
Belgium	1,745	0.001	0.037	-0.012	0.000	0.016
Bulgaria	171	0.021	0.051	-0.001	0.010	0.047
Czech Republic	1,091	-0.007	0.046	-0.027	-0.005	0.014
Estonia	139	0.007	0.045	-0.014	0.002	0.031
Finland	744	-0.007	0.037	-0.023	-0.004	0.012
France	4,882	0.002	0.032	-0.008	0.003	0.016
Germany	685	-0.004	0.057	-0.027	0.006	0.030
Greece	743	0.026	0.034	0.007	0.025	0.044
Hungary	105	-0.011	0.050	-0.038	-0.012	0.019
Ireland	174	0.003	0.043	-0.007	0.000	0.014
Italy	5,233	0.009	0.029	-0.004	0.008	0.023
Latvia	181	0.024	0.053	-0.002	0.017	0.053
Lithuania	57	0.053	0.053	0.026	0.054	0.085
Netherlands	430	-0.006	0.041	-0.019	-0.003	0.006
Poland	1,445	0.000	0.051	-0.023	-0.001	0.022
Portugal	531	0.008	0.039	-0.009	0.006	0.028
Slovakia	106	-0.019	0.043	-0.044	-0.018	0.001
Spain	3,141	0.007	0.033	-0.005	0.003	0.020
Sweden	1,421	-0.005	0.041	-0.023	-0.003	0.013
UK	3,498	0.006	0.038	-0.006	0.003	0.018
Total	26,665	0.004	0.038	-0.009	0.003	0.020

Note: The number of observations in the sample, N, corresponds to the number of firms with non-missing average External Finance Use (EFU) calculated based on at least 5 annual EFU values within the 1996-2005 period. Annual EFU is defined as change in shareholders' capital plus change in firm's long-term debt plus change in firm's other non-current liabilities scaled by total assets. Before computing the statistics we remove EFU outliers (we use the 1-to-99 percentile range of annual EFU values). See Appendix Tables A.1a, A.1b, and A.1c for complete definitions and sources of variables.

Table 2: Financial Development: European Countries

	Mean	S.D.	Min	Max	Min Country	Max Country	N
Total Capitalization	1.05	0.94	0.08	4.21	Latvia	Netherlands	20
Private Credit	0.70	0.68	0.06	3.31	Latvia	Netherlands	21
Market Capitalization	0.32	0.34	0.00	1.33	Bulgaria	UK	20
Market Value Traded	0.19	0.21	0.00	0.82	Bulgaria	Netherlands	20
Accounting Standards	0.64	0.13	0.36	0.83	Portugal	Sweden	12
Gov. Bank Ownership	0.37	0.28	0.00	0.86	UK	Bulgaria	18
Gov. Bank Control	0.38	0.31	0.00	0.92	UK	Bulgaria	18
Overhead Costs	3.69	2.19	0.25	9.45	Ireland	Bulgaria	19
Net Interest Margin	3.65	1.92	1.18	7.28	Netherlands	Latvia	19
Control Premium	0.17	0.19	0.01	0.58	Netherlands	Czech Republic	11

Note: We present the Min, Max, Mean, and Standard Deviation of country-level financial development measures across Europe. Accounting Standards are as of 1990, Control Premium is estimated for the 1990-2000 period, Government Bank Ownership and Government Bank Control are as of 1995, and all remaining measures are as of 1996. Total Capitalization, Market Capitalization, and Market Value Traded are missing for Estonia. Accounting Standards are missing for Bulgaria, Czech Republic, Estonia, Hungary, Ireland, Lithuania, Latvia, Poland, and Slovakia. Government Bank Ownership and Government Bank Control are missing for Estonia, Lithuania, and Latvia. Overhead Costs and Net Interest Margin are missing for Finland and Sweden. Control Premium is missing for Belgium, Bulgaria, Estonia, Greece, Hungary, Ireland, Lithuania, Latvia, Poland, and Slovakia. See Appendix Tables A.1a, A.1b, and A.1c for complete definitions and sources of variables.

Table 3: Growth Opportunities and Technology Characteristics: Industry Data, 1996-2005

ISIC rev. 3.1	US Growth		Global PE Level		Global PE Growth		R&D Intensity		Investment Lumpiness		External Finance Dependence	
	Mean		Mean		Mean		N	Median	N	Median	N	Median
15	-1.5%	23.87	2.3%	81	0.154	327	0.694	251	-0.117			
16	-2.0%	13.95	2.8%	10	0.245	23	1.043	16	-0.124			
17	-2.3%	19.41	0.8%	23	0.434	118	0.517	69	0.204			
18	-7.7%	19.41	0.8%	5	0.000	58	1.759	50	-0.382			
19	-4.9%	17.24	-2.1%	14	0.789	41	1.902	31	-1.548			
20	0.2%	20.52	3.1%	14	0.077	71	0.465	48	-0.061			
21	-0.2%	20.65	2.4%	59	0.146	143	0.476	120	-0.020			
22	4.8%	24.67	1.5%	47	0.745	239	1.490	172	-0.217			
23	4.9%	18.92	1.2%	54	0.060	146	0.849	109	0.658			
24	1.9%	19.56	1.9%	1,197	4.171	1,573	2.254	1,300	1.821			
25	2.3%	16.98	0.7%	90	0.257	212	0.675	138	-0.082			
26	1.8%	13.87	0.4%	49	0.157	120	0.792	85	-0.101			
27	0.7%	17.58	-0.8%	58	0.131	186	0.538	139	0.073			
28	0.4%	27.17	-0.1%	57	0.215	198	0.429	114	-0.320			
29	0.8%	23.27	0.0%	397	0.836	705	1.216	482	-0.117			
30	14.5%	38.45	1.5%	322	3.970	512	2.621	336	0.886			
31	-0.6%	31.29	2.2%	237	1.363	371	1.733	269	0.417			
32	14.7%	41.13	1.2%	400	2.405	611	2.373	439	0.840			
33	17.7%	29.76	2.8%	673	2.933	1,008	2.144	711	0.665			
34	2.1%	16.86	3.0%	65	0.392	115	1.200	90	0.170			
35	2.3%	20.90	2.6%	94	0.617	174	0.954	129	-0.117			
36	NA	20.66	-0.3%	91	0.537	238	1.403	166	-0.141			

Note: US Growth, Global PE Level, and Global PE Growth are for each 2-digit ISIC industry over the 1996-2005 period, the average growth rate of real value added in the US, the average world price-to-earnings ratio, and the average growth rate of the world price-to-earnings ratio, respectively. R&D Intensity is the time average of R&D to capital expenditure ratio of a median firm for each US 3-digit ISIC industry over the 1996-2005 period. Investment Lumpiness is the number of investment spikes experienced by a median firm in each US 3-digit ISIC industry over the 1996-2005 period. The investment spike is an event when annual capital expenditure exceeds 30 percent of the firm's stock of fixed assets. External Finance Dependence (EFD) is the share of capital expenditures not financed by cash flow from operations of a median firm for each US 3-digit ISIC industry over the 1996-2005 period. N stands for the number of Compustat firms used to find the median values. All statistics are reported at 2-digit ISIC level, but we use 3-digit ISIC level industries for R&D Intensity, Investment Lumpiness, and External Finance Dependence in our regressions. See Appendix Tables A.1a, A.1b, and A.1c for complete definitions and sources of variables.

Table 4: Growth Opportunities and Technology Characteristics: Descriptive Statistics

<i>Panel A: Basic Statistics</i>						
	US Growth	Global PE Level	Global PE Growth	R&D Intensity	Investment Lumpiness	EFD
Mean	2.4%	22.55	1.3%	0.928	1.226	0.051
S.D.	6.3%	7.16	1.4%	1.478	0.723	0.885
N	21	22	22	58	58	58
<i>Panel B: Rank Correlations</i>						
	US Growth	Global PE Level	Global PE Growth	R&D Intensity	Investment Lumpiness	EFD
US Growth	1					
Global PE Level	0.335 (0.138) 21	1				
Global PE Growth	0.165 (0.475) 21	0.153 (0.509)	1			
R&D Intensity	0.416 (0.061*) 21	0.480 (0.028**) 21	0.060 (0.795) 21	1		
Investment Lumpiness	0.342 (0.130) 21	0.327 (0.147) 21	0.059 (0.801) 21	0.653 (0.000***) 58	1	
EFD	0.552 (0.010***) 21	0.281 (0.217) 21	0.293 (0.198) 21	0.216 (0.104) 58	0.255 (0.054*) 58	1

Note: In Panel A, we present descriptive statistics for US Growth, Global PE Level, and Global PE Growth on 2-digit ISIC industries and R&D Intensity, Investment Lumpiness and EFD on 3-digit ISIC industries over the 1996-2005 period (see Tables 3 and A.1b for definitions of the variables). Panel B presents Spearman rank correlations with corresponding p-values in brackets and the number of observations used to estimate it.

Table 5: Financial Development and External Finance Use: Basic Estimates

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
FD * US Growth	0.027*** (0.01)	0.053*** (0.016)	0.038* (0.02)	0.115*** (0.04)	0.084 (0.054)
Total Assets	-0.062*** (0.01)	-0.062*** (0.01)	-0.062*** (0.01)	-0.062*** (0.01)	-0.069*** (0.01)
Total Assets Squared	0.064*** (0.011)	0.064*** (0.011)	0.064*** (0.011)	0.064*** (0.011)	0.067*** (0.011)
Employees	-0.062*** (0.019)	-0.063*** (0.019)	-0.061*** (0.019)	-0.062*** (0.019)	-0.037* (0.02)
Employees Squared	0.187*** (0.053)	0.189*** (0.053)	0.185*** (0.053)	0.186*** (0.053)	0.161*** (0.057)
Age	-0.010*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)	-0.007** (0.003)
Age Squared	0.007* (0.004)	0.007* (0.004)	0.007* (0.004)	0.007* (0.004)	0.005 (0.004)
Leverage	-0.019*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)
Tangibility	-0.014*** (0.002)	-0.014*** (0.002)	-0.014*** (0.002)	-0.014*** (0.002)	-0.013*** (0.002)
Collateral	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)
Cash	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.006** (0.003)
Quoted	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)	0.016*** (0.002)
Constant	-0.006 (0.006)	-0.006 (0.006)	-0.006 (0.006)	-0.006 (0.007)	-0.009 (0.006)
Country and Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
R ²	0.078	0.077	0.077	0.078	0.076
N	25,419	25,544	25,419	25,419	22,239

Note: The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as change in shareholders' capital plus change in a firm's long-term debt plus change in a firm's other non-current liabilities scaled by total assets. The average is taken over years in which a firm is present in the sample within the 1996-2005 period. US Growth is the time average of the real value-added growth of US 2-digit ISIC industries calculated, for each firm, over the same years for which EFU is computed. Country-level measures of Financial Development (FD) are predetermined. Firm-level control variables come from the first year a firm enters the sample and remain fixed over time. Total Assets are in EUR billions. Employees is the number of employees and it is scaled down by 10,000. Age is the number of years since a firm's incorporation and it is scaled down by 100. Leverage is the ratio of long- plus short-term debt to total assets. Tangibility is the ratio of fixed assets to total assets. Collateral is measured as fixed assets plus inventories plus receivables divided by total assets. Cash is the ratio of cash holdings to total assets. Quoted is a dummy variable with a base of non-quoted firms. See Appendix Tables A.1a, A.1b, and A.1c for complete definitions and sources of variables. All specifications are linear regressions with outliers removed (we use the 1-to-99 percentile range of the dependent variable). We always control for country and 3-digit ISIC industry dummies. Robust standard errors (clustered at industry-country level) are reported in parentheses; *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 6: Financial Development and External Finance Use: Growth Opportunities

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
<i>Panel A: All Europe</i>					
FD * US Growth	0.027*** (0.01)	0.053*** (0.016)	0.038* (0.02)	0.115*** (0.04)	0.084 (0.054)
R ²	0.078	0.077	0.077	0.078	0.076
N	25,419	25,544	25,419	25,419	22,239
FD * Global PE Level	0.003 (0.002)	0.004 (0.003)	0.004 (0.003)	0.004 (0.008)	0.021* (0.011)
R ²	0.077	0.076	0.077	0.077	0.075
N	26,526	26,665	26,526	26,526	23,196
FD * Global PE Growth	0.026*** (0.008)	0.034*** (0.013)	0.070*** (0.018)	0.088** (0.039)	0.043** (0.019)
R ²	0.078	0.077	0.078	0.077	0.076
N	26,526	26,665	26,526	26,526	23,196
<i>Panel B: EU-15</i>					
FD * US Growth	0.036*** (0.01)	0.069*** (0.015)	0.046** (0.02)	0.139*** (0.038)	0.084 (0.054)
R ²	0.077	0.077	0.076	0.077	0.076
N	22,407	22,407	22,407	22,407	22,239
FD * Global PE Level	0.003 (0.002)	0.005 (0.004)	0.004 (0.003)	0.005 (0.008)	0.021* (0.011)
R ²	0.077	0.075	0.075	0.075	0.075
N	26,526	23,370	23,370	23,370	23,196
FD * Global PE Growth	0.030*** (0.008)	0.041*** (0.013)	0.075*** (0.018)	0.100*** (0.038)	0.043** (0.019)
R ²	0.076	0.076	0.076	0.076	0.076
N	23,370	23,370	23,370	23,370	23,196

Note: The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as change in shareholders' capital plus change in a firm's long-term debt plus change in a firm's other non-current liabilities scaled by total assets. The average is taken over years in which a firm is present in the sample within the 1996-2005 period. US Growth is the time average of the real value-added growth of US 2-digit ISIC industries calculated, for each firm, over the same years for which EFU is computed. Global PE Level and Global PE Growth are the time averages of the world price-to-earnings ratios and of the growth rates of the world price-to-earnings ratios at 2-digit ISIC level, respectively. The time span of values that enter Global PE Level and Global PE Growth calculations is determined analogously to US Growth. Panel A is based on full sample of European countries. Panel B is based on EU-15 countries. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, firm-level controls (see Table 5 notes for their definitions), and 3-digit ISIC industry and country dummies. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively, based on robust standard errors clustered at the industry-country level.

Table 7: Financial Development and External Finance Use: Technology Characteristics

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
<i>Panel A: All Europe</i>					
FD * R&D Intensity	0.080*** (0.028)	0.147** (0.06)	0.098* (0.058)	0.269** (0.12)	0.111 (0.269)
R ²	0.077	0.075	0.075	0.075	0.073
N	26,259	24,629	24,517	24,517	21,495
FD * Investment Lumpiness	0.247*** (0.058)	0.473*** (0.134)	0.309*** (0.11)	0.760*** (0.236)	0.43 (0.504)
R ²	0.078	0.077	0.077	0.077	0.075
N	26,514	26,653	26,514	26,514	23,187
FD * EFD	0.091** (0.04)	0.158** (0.074)	0.136 (0.083)	0.305* (0.183)	0.502 (0.437)
R ²	0.077	0.076	0.076	0.076	0.075
N	26,259	26,392	26,259	26,259	22,975
<i>Panel B: EU-15</i>					
FD * R&D Intensity	0.079*** (0.029)	0.141** (0.06)	0.090 (0.057)	0.257** (0.126)	0.111 (0.269)
R ²	0.074	0.074	0.074	0.074	0.073
N	21,655	21,655	21,655	21,655	21,495
FD * Investment Lumpiness	0.207*** (0.054)	0.401*** (0.12)	0.235** (0.105)	0.596** (0.24)	0.430 (0.504)
R ²	0.076	0.076	0.075	0.075	0.075
N	23,361	23,361	23,361	23,361	23,187
FD * EFD	0.120*** (0.045)	0.189** (0.09)	0.178* (0.093)	0.395** (0.194)	0.502 (0.437)
R ²	0.075	0.075	0.075	0.075	0.075
N	23,149	23,149	23,149	23,149	22,975

Note: The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as change in shareholders' capital plus change in a firm's long-term debt plus change in a firm's other non-current liabilities scaled by total assets. The average is taken over years in which a firm is present in the sample within the 1996-2005 period. R&D Intensity is the time average of R&D to capital expenditure ratios of a median firm for each US 3-digit ISIC industry over the 1996-2005 period. Investment Lumpiness is the number of investment spikes experienced by a median firm in each US 3-digit ISIC industry over the 1996-2005 period. The investment spike is an event when annual capital expenditure exceeds 30 percent of the firm's stock of fixed assets. External Finance Dependence (EFD) is the share of capital expenditures not financed by cash flow from operations of a median firm for each US 3-digit ISIC industry over the 1996-2005 period. Panel A is based on full sample of European countries. Panel B is based on EU-15 countries. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, firm-level controls (see Table 5 notes for their definitions), and 3-digit ISIC industry and country dummies. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively, based on robust standard errors clustered at the industry-country level.

Table 8: Financial Development and External Finance Use: Growth vs. Technology

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
<i>Panel A: US Growth</i>					
FD * US Growth	0.026** (0.011)	0.050*** (0.018)	0.035 (0.023)	0.111** (0.045)	0.087 (0.06)
FD * R&D Intensity	0.048* (0.025)	0.095* (0.049)	0.05 (0.051)	0.127 (0.124)	-0.007 (0.274)
R ²	0.076	0.075	0.075	0.076	0.074
N	23,410	23,508	23,410	23,410	20,538
FD * US Growth	0.013 (0.011)	0.028 (0.018)	0.019 (0.021)	0.074* (0.043)	0.078 (0.055)
FD * Investment Lumpiness	0.218*** (0.061)	0.410*** (0.139)	0.272** (0.112)	0.599** (0.251)	0.296 (0.509)
R ²	0.078	0.078	0.078	0.078	0.076
N	25,407	25,532	25,407	25,407	22,230
FD * US Growth	0.024** (0.011)	0.047*** (0.017)	0.033 (0.021)	0.104** (0.042)	0.076 (0.055)
FD * EFD	0.056 (0.038)	0.094 (0.064)	0.092 (0.08)	0.158 (0.192)	0.388 (0.436)
R ²	0.077	0.077	0.077	0.077	0.076
N	25,152	25,271	25,152	25,152	22,018
<i>Panel B: Global PE Growth</i>					
FD * Global PE Growth	0.027*** (0.008)	0.035** (0.014)	0.076*** (0.019)	0.098** (0.041)	0.047** (0.021)
FD * R&D Intensity	0.063** (0.028)	0.127** (0.059)	0.048 (0.055)	0.205* (0.122)	0.079 (0.27)
R ²	0.076	0.075	0.076	0.076	0.074
N	24,517	24,629	24,517	24,517	21,495
FD * Global PE Growth	0.022*** (0.008)	0.027** (0.013)	0.063*** (0.019)	0.071* (0.039)	0.043** (0.019)
FD * Investment Lumpiness	0.218*** (0.06)	0.440*** (0.137)	0.220** (0.11)	0.667*** (0.24)	0.384 (0.503)
R ²	0.078	0.078	0.078	0.078	0.075
N	26,514	26,653	26,514	26,514	23,187
FD * Global PE Growth	0.026*** (0.008)	0.034** (0.013)	0.071*** (0.019)	0.092** (0.041)	0.046** (0.02)
FD * EFD	0.070* (0.039)	0.131* (0.073)	0.086 (0.081)	0.226 (0.184)	0.447 (0.435)
R ²	0.077	0.076	0.077	0.077	0.075
N	26,259	26,392	26,259	26,259	22,975

Note: The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as change in shareholders' capital plus change in a firm's long-term debt plus change in a firm's other non-current liabilities scaled by total assets. The average is taken over years in which a firm is present in the sample within the 1996-2005 period. Panel A uses US Growth while Panel B is based on Global PE Growth (see Table 6 notes for definitions of these variables). R&D Intensity, Investment Lumpiness, and External Finance Dependence (EFD) are defined as in Table 7. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, firm-level controls (see Table 5 notes for their definitions), and 3-digit ISIC industry and country dummies. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively, based on robust standard errors clustered at the industry-country level.

Table 9: Financial Development and External Finance Use: Decomposition

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
<i>Panel A: Changes in Shareholders' Equity</i>					
FD * US Growth	0.009** (0.004)	0.013** (0.006)	0.017** (0.008)	0.032** (0.015)	0.049*** (0.018)
R ²	0.070	0.070	0.071	0.070	0.070
N	24,642	24,764	24,642	24,642	21,781
FD * Global PE Growth	0.005* (0.003)	0.006 (0.004)	0.016** (0.008)	0.015 (0.013)	0.016** (0.007)
R ²	0.069	0.069	0.069	0.069	0.068
N	24,642	24,764	24,642	24,642	21,781
<i>Panel B: Changes in Long-Term Debt</i>					
FD * US Growth	0.017*** (0.006)	0.029** (0.012)	0.029** (0.012)	0.067*** (0.023)	0.071* (0.042)
R ²	0.094	0.094	0.094	0.094	0.089
N	24,642	24,764	24,642	24,642	21,781
FD * Global PE Growth	0.013** (0.006)	0.016* (0.008)	0.039*** (0.014)	0.038 (0.029)	0.019 (0.014)
R ²	0.093	0.093	0.094	0.093	0.087
N	25,709	25,845	25,709	25,709	22,711
<i>Panel C: Changes in Other Non-Current Liabilities</i>					
FD * US Growth	0.004 (0.005)	0.014 (0.01)	-0.005 (0.007)	0.017 (0.019)	-0.002 (0.027)
R ²	0.037	0.037	0.037	0.037	0.032
N	24,639	24,761	24,639	24,639	21,780
FD * Global PE Growth	0.003 (0.004)	0.006 (0.007)	0.004 (0.008)	0.012 (0.019)	-0.001 (0.01)
R ²	0.037	0.037	0.037	0.037	0.032
N	25,706	25,842	25,706	25,706	22,710
<i>Panel D: Changes in Total Non-Current Liabilities</i>					
FD * US Growth	0.018** (0.008)	0.041*** (0.014)	0.018 (0.014)	0.077*** (0.029)	0.048 (0.047)
R ²	0.070	0.069	0.070	0.070	0.066
N	24,642	24,764	24,642	24,642	21,781
FD * Global PE Growth	0.017** (0.007)	0.023** (0.011)	0.043** (0.016)	0.056 (0.034)	0.018 (0.017)
R ²	0.070	0.069	0.070	0.070	0.066
N	25,709	25,845	25,709	25,709	22,711

Note: The dependent variable in Panel A, B, C, and D is the time average of annual firm-level changes in shareholders' capital, in a firm's long-term debt, in a firm's other non-current liabilities, and in a firm's total non-current liabilities, respectively. The averages are taken over years in which a firm is present in the sample within the 1996-2005 period and are scaled by total assets. Total non-current liabilities equal long-term debt plus other non-current liabilities. See Table 6 notes for definitions of US Growth and Global PE Growth. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, firm-level controls (see Table 5 notes for their definitions), and 3-digit ISIC industry and country dummies. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively, based on robust standard errors clustered at the industry-country level.

Table A.1a: Definitions and Sources of Variables

Name	Definition and Source
<i>Firm-Level Variables</i>	
Total Assets	Firm's total assets (TOAS) in EUR billions. We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Employees	Number of employees (EMPL) scaled down by 10,000. We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Age	The number of years since a firm's incorporation, scaled down by 100. We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
External Finance Use	First, we sum the year-on-year change in shareholders' capital ($CAPL_t - CAPL_{t-1}$), the year-on-year change in firm's long-term debt ($LTDB_t - LTDB_{t-1}$), and the year-on-year change in firm's other non-current liabilities ($ONCLI_t - ONCLI_{t-1}$). The result is scaled by total assets from the beginning of each year ($TOAS_{t-1}$). Second, we compute the time average of annual measures from the first step over the years in which a firm is present in the sample within the 1996-2005 period. Source: Amadeus.
Leverage	Defined as long-term debt (LTDB) plus current liabilities (CULI) divided by total assets (TOAS). We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Tangibility	Defined as fixed assets (FIAS) divided by total assets (TOAS). We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Collateral	Defined as fixed assets (FIAS) plus inventories (STOK) plus accounts receivables (DEBT) divided by total assets (TOAS). We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Cash	Defined as cash holdings (CASH) divided by total assets (TOAS). We use the value from the first year a firm enters the sample. Source: Amadeus.
Quoted	0/1 variable, equal 1 if a firm is a publicly listed company and 0 otherwise. Source: Amadeus.

Table A.1b: Definitions and Sources of Variables

Name	Definition and Source
<i>Industry-Level Variables</i>	
R&D Intensity	First, for each Compustat firm, we compute the time average of R&D expenditures and capital expenditures over the 1996-2005 period and take the ratio of the two averages. Second, we take the ratio from the first step of the median US firm for each 3-digit ISIC industry. Source: Compustat.
Investment Lumpiness	First, for each Compustat firm, we compute the average number of investment spikes it experienced over the 1996-2005 period. An investment spike is defined as an event when annual capital expenditure exceeds 30 percent of the firm's stock of fixed assets. Second, we take the average of the statistic computed in the first step for each US 3-digit ISIC industry Source: Compustat.
External Finance Dependence	First, for each Compustat firm, we sum capital expenditures and cash flows from operations over the 1996-2005 period. Second, for each Compustat firm, we compute the ratio of capital expenditures minus cash flows from operations over capital expenditures using the sums obtained in the first step. Third, we take the ratio from the second step of the median US firm for each 3-digit ISIC industry. Source: Compustat.
US Growth	First, we compute year-on-year growth rates by taking the difference of natural logarithms of annual real value added for each US 2-digit ISIC industry. Second, for each firm in our sample, we compute the time average of year-on-year growth rates over the same years for which External Finance Use is computed. Source: OECD STAN.
Global PE Level	First, we take the world price-to-earnings ratios of industry portfolios as they are defined in Datastream. Second, for each firm in our sample, we compute the time average of the world price-to-earnings ratios over the same years for which External Finance Use is computed. Finally, we match Datastream industries into 2-digit ISIC. Source: Datastream.
Global PE Growth	First, we compute year-on-year growth rates of the world price-to-earnings ratio of industry portfolios as they are defined in Datastream. Second, for each firm in our sample, we compute the time average of the year-on-year growth rates over the same years for which External Finance Use is computed. Finally, we match Datastream industries to 2-digit ISIC. Source: Datastream.

Table A.1c: Definitions and Sources of Variables

Name	Definition and Source
<i>Country-Level Variables</i>	
Total Capitalization	Private credit by deposit money banks and other financial institutions plus stock market capitalization divided by GDP in 1996. Source: Beck et al. (2000).
Private Credit	Private credit by deposit money banks and other financial institutions divided by GDP in 1996. Source: Beck et al. (2000).
Market Capitalization	Stock market capitalization divided by GDP in 1996. Source: Beck et al. (2000).
Market Value Traded	Stock market total value traded divided by GDP in 1996. Source: Beck et al. (2000).
Accounting Standards	Index created by examining and rating companies' 1990 annual reports on their inclusion or omission of 90 items in balance sheets and income statements and published by the Center for International Financial Analysis & Research, Inc. The maximum is 90, the minimum 0, and we scaled it down by 100. Source: The Center for International Financial Analysis & Research.
Government Bank Ownership	Share of the top 10 banks' assets owned by a country's government in 1995. The percentage of the assets owned by the government in a given bank is calculated by multiplying the share of each shareholder in that bank by the share the government owns in that shareholder, and then summing the resulting ownership stakes. Source: La Porta et al. (2002).
Government Bank Control	Share of the top 10 banks' assets controlled by a country's government at the 50 percent level in 1995. The percentage of assets owned by the government in a given bank is calculated following the same methodology outlined for Government Bank Ownership. Source: La Porta et al. (2002).
Overhead Costs	Accounting value of banks' overhead costs as a share of their total assets. Scaled up by 100. Source: Beck et al. (2000).
Net Interest Margin	Accounting value of banks' net interest revenue as a share of their interest-bearing assets. Scaled up by 100. Source: Beck et al. (2000).
Control Premium	Control premium estimated by Dyck and Zingales (2004) using the sample of 393 controlling blocks sales in 1990-2000 period. We use the estimated country fixed effects from Table III, column (1).

Table A.2: Financial Development and External Finance Use: Robustness Checks

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
<i>Panel A: Limited Liability Companies Only</i>					
FD * US Growth	0.025** (0.01)	0.050*** (0.016)	0.031 (0.02)	0.098** (0.042)	0.074 (0.064)
R ²	0.082	0.081	0.081	0.082	0.08
N	17,099	17,223	17,099	17,099	15,129
FD * Global PE Growth	0.027*** (0.009)	0.034** (0.014)	0.071*** (0.019)	0.105*** (0.039)	0.044* (0.023)
R ²	0.081	0.08	0.082	0.081	0.079
N	17,879	18,017	17,879	17,879	15,820
<i>Panel B: Only Industries with at Least 20 Firms</i>					
FD * US Growth	0.032** (0.014)	0.081*** (0.03)	0.039* (0.023)	0.128*** (0.048)	0.141*** (0.055)
R ²	0.071	0.072	0.071	0.071	0.071
N	24,024	24,024	24,024	24,024	21,507
FD * Global PE Growth	0.030*** (0.009)	0.045*** (0.014)	0.071*** (0.019)	0.097** (0.041)	0.052*** (0.019)
R ²	0.071	0.071	0.072	0.071	0.071
N	25085	25085	25085	25085	22441
<i>Panel C: Controlling for Industry-Period Fixed Effects</i>					
FD * US Growth	0.028*** (0.011)	0.055*** (0.016)	0.039* (0.022)	0.121*** (0.041)	0.097 (0.061)
R ²	0.080	0.079	0.080	0.080	0.079
N	25,419	25,544	25,419	25,419	22,239
FD * Global PE Growth	0.041*** (0.009)	0.053*** (0.015)	0.102*** (0.02)	0.139*** (0.044)	0.054** (0.025)
R ²	0.080	0.079	0.080	0.080	0.078
N	26,526	26,665	26,526	26,526	23,196
<i>Panel D: Median Regressions</i>					
FD * US Growth	0.008 (0.007)	0.017 (0.017)	0.01 (0.014)	0.009 (0.029)	0.021** (0.01)
Pseudo-R ²	0.038	0.037	0.038	0.038	0.036
N	25,419	25,544	25,419	25,419	22,239
FD * Global PE Growth	0.008 (0.005)	0.012 (0.009)	0.017 (0.014)	0.009 (0.029)	0.021* (0.011)
Pseudo-R ²	0.038	0.038	0.038	0.038	0.036
N	26,526	26,665	26,526	26,526	23,196

Note: The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as in Table 5. We re-estimate the basic specification from table 6 on the sub-sample of companies with limited and limited liability legal forms in Panel A. Panel B restricts sample to ISIC 2-digit industry-country pairs with at least 20 firms available. Panel C presents estimates obtained while controlling for firm specific industry-period fixed effects, where period is defined by the availability of annual External Finance Use. Panel D presents estimates obtained from median regressions. Except Panel D, all specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, firm-level controls (see Table 5 notes for their definitions), and country and (with the exception of panel C) 3-digit ISIC industry dummies. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively, based on robust standard errors clustered at the industry-country level in Panels A, B and C and on bootstrapped standard errors clustered at the industry-country level in Panel D.

Table A.3: Growth Opportunities and Measurement Error

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
<i>Panel A : Instrumenting by Global PE Growth</i>					
FD * US Growth	0.152*** (0.054)	0.225** (0.097)	0.284*** (0.106)	0.443** (0.209)	0.601** (0.304)
R ²	0.068	0.071	0.066	0.074	0.069
N	25,419	25,544	25,419	25,419	22,239
<i>First-Stage Regression Statistics:</i>					
Partial R ²	0.042	0.038	0.056	0.043	0.032
F-statistics	23.41	15.71	14.07	23.46	23.74
p-value	0.000	0.000	0.000	0.000	0.000
<i>Panel B : Instrumenting by US Growth</i>					
FD * Global PE Growth	0.107*** (0.038)	0.196*** (0.061)	0.161* (0.083)	0.498*** (0.173)	0.172 (0.11)
R ²	0.071	0.066	0.076	0.069	0.073
N	25,419	25,544	25,419	25,419	22,239
<i>First-Stage Regression Statistics:</i>					
Partial R ²	0.042	0.038	0.056	0.043	0.032
F-statistics	61.32	58.00	39.99	62.65	28.52
p-value	0.000	0.000	0.000	0.000	0.000

Note: The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as in Table 5. In Panel A, FD * US Growth is instrumented by FD * Global PE Growth, while in Panel B FD * Global PE Growth is instrumented by FD * US Growth (see Table 6 notes for definitions of these variables). F-statistics is the test of the significance of instrument in first stage regression and its p-value is reported in parentheses. All specifications have outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, firm-level controls (see Table 5 notes for their definitions), and 3-digit ISIC industry and country dummies. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively, based on robust standard errors clustered at the industry-country level.

Table A.4: Financial Development and External Finance Use: Alternative Growth Opportunities

Country	Total Capitalization * VA Growth	S.D.	R ²	N	Total Capitalization
AT	0.035***	(0.009)	0.076	26,589	1.07
BE	-0.006	(0.016)	0.076	24,964	1.15
CA	0.011	(0.016)	0.077	24,768	1.64
CH	0.008	(0.012)	0.076	26,732	3.02
CZ	0.007	(0.005)	0.076	25,632	0.93
DE	0.023*	(0.012)	0.075	26,046	1.29
DK	0.018**	(0.008)	0.077	26,732	0.65
ES	-0.000	(0.016)	0.078	23,575	1.06
FI	-0.002	(0.010)	0.074	25,986	1.02
FR	0.026***	(0.008)	0.081	21,778	1.19
GR	0.005	(0.010)	0.068	25,989	0.49
HU	0.008*	(0.005)	0.076	26,627	0.29
IS	-0.005	(0.007)	0.074	26,486	0.60
IT	-0.029	(0.023)	0.079	21,465	0.73
JP	0.010	(0.010)	0.077	25,419	2.76
KR	0.013*	(0.007)	0.077	25,419	1.41
LU	0.024***	(0.007)	0.073	23,958	2.60
NL	0.019	(0.020)	0.077	26,300	4.21
NO	-0.005	(0.014)	0.074	19,691	1.13
PT	-0.002	(0.007)	0.077	26,200	0.92
SE	0.007*	(0.004)	0.077	25,104	1.82
SK	-0.013**	(0.005)	0.076	26,625	0.47
US	0.028***	(0.010)	0.078	25,419	2.57

Note: The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as in Table 5. We re-estimate the basic specification from table 5 by replacing VA Growth of US industries with VA Growth of industries located in a set of OECD countries. Each row of the table corresponds to the regression where industry-specific VA Growth comes from a country given in first column, with observations from this country dropped. We report value of estimated coefficient on the interaction of Total Capitalization and VA Growth of industries in a given country, its standard deviation, R² of a regression and Number of observations. Last column reports Total Capitalization of a country given in first column. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, firm-level controls (see Table 5 notes for their definitions), and country and 3-digit ISIC industry dummies. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively, based on robust standard errors clustered at the industry-country level.

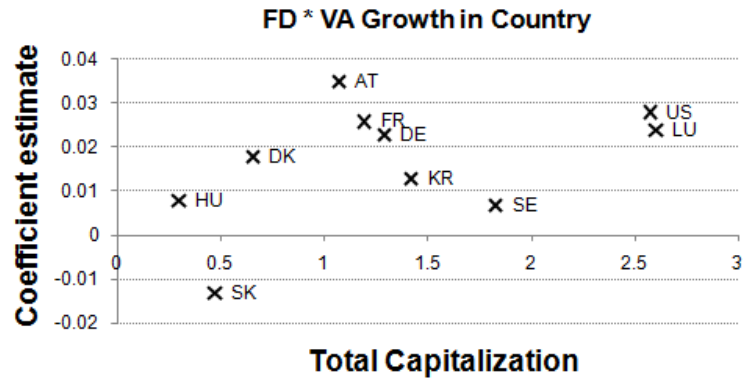


Figure 1: Industry growth rates in selected OECD countries as alternative proxies for growth opportunities

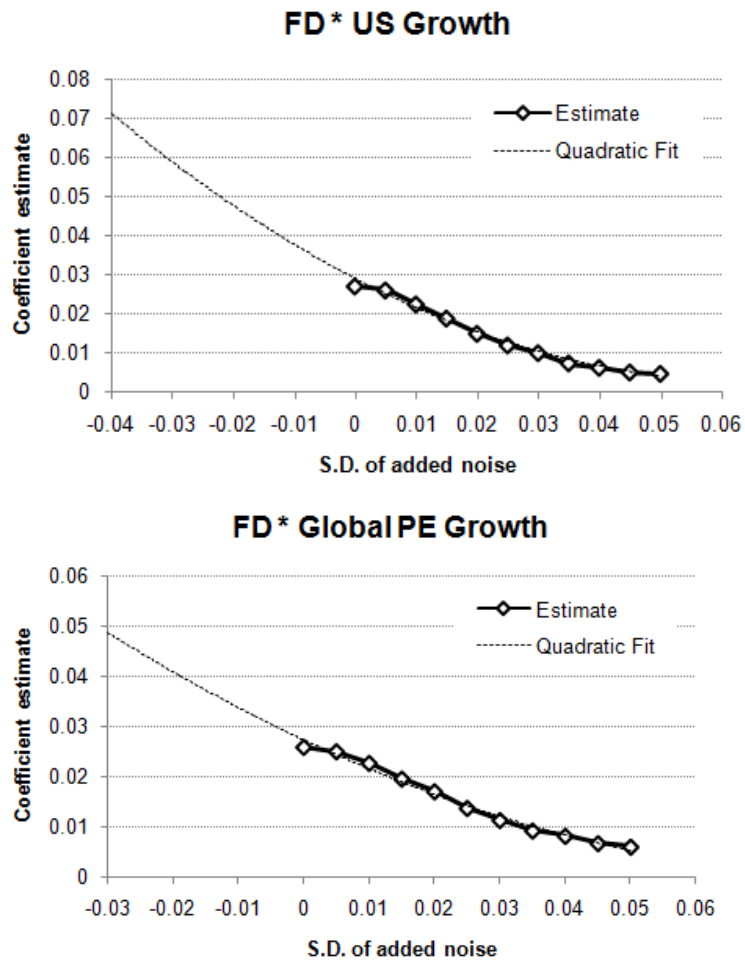


Figure 2: Sensitivity of estimates to added noise in GO_i

Table A.5: Alternative Measures of Financial Development

	Gov. Bank Ownership	Gov. Bank Control	Overhead Costs	Net. Int. Margin	Control Premium
FD * US Growth	-0.014 (0.038)	-0.002 (0.037)	-0.006 (0.007)	-0.001 (0.007)	-0.085** (0.04)
R ²	0.074	0.074	0.073	0.073	0.065
N	25,196	25,196	23,454	23,454	20,871
FD * Global PE growth	-0.076** (0.033)	-0.071** (0.033)	-0.007** (0.004)	-0.006* (0.003)	-0.049 (0.051)
R ²	0.074	0.074	0.073	0.073	0.065
N	26,288	26,288	24,500	24,500	21,799

Note: The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as in Table 5. Country-level measures of Financial Development (FD) are predetermined; see Table A.1c for their complete definitions and sources. US Growth and Global PE Growth are as in Table 6. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, firm-level controls (see Table 5 notes for their definitions), and 3-digit ISIC industry and country dummies. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively, based on robust standard errors clustered at the industry-country level.

A Balance Sheet Definition of External Finance Use

Rajan and Zingales (1998) define external finance dependence (EFD) as the share of capital expenditure (CE) not financed by cash flow (CF)

$$EFD_t = \frac{CE_t - CF_t}{CE_t}.$$

To measure External Finance Use (our main dependent variable), we find an analogy to their definition using balance sheet data that are available for most firms in our sample. In a panel of annual firm balance sheet items, we can approximate capital expenditure by the change in fixed assets ($FIAS$) plus depreciation ($DEPRE$)

$$\begin{aligned} CE_t &= (FIAS_t - FIAS_{t-1}) + DEPRE_t & (A-1) \\ &= \Delta FIAS_t + DEPRE_t. \end{aligned}$$

Cash flow is approximated by firm's net profit (PL , measured after taxes and interest payments) increased by depreciation (depreciation is cost but not cash outflow) and adjusted for the change in the net working capital. An increase in current assets ($CUAS$) uses cash while an increase in current liabilities ($CULI$) releases cash

$$\begin{aligned} CF_t &= PL_t + DEPRE_t - (CUAS_t - CUAS_{t-1}) + (CULI_t - CULI_{t-1}) & (A-2) \\ &= PL_t + DEPRE_t - \Delta CUAS_t + \Delta CULI_t. \end{aligned}$$

Next, we show how is difference $CE_t - CF_t$ related to the amount of external finance raised. The fundamental balance sheet identity necessitates that change in total assets equals change in equity plus change in liabilities. Decomposing total assets into fixed assets ($FIAS$), current assets ($CUAS$, i.e. inventories and accounts receivables), and cash ($CASH$); and decomposing total liabilities into shareholders' equity (CAP), other

shareholders' funds (*OSFD*, i.e. reserves and retained earnings), long-term debt (*LTDB*), other non-current liabilities (*ONCLI*, i.e. provisions), and current liabilities (*CULI*, i.e. short-term loans and accounts payables), the balance sheet identity becomes

$$\Delta FIAS_t + \Delta CUAS_t + \Delta CASH_t = \Delta CAPI_t + \Delta OSFD_t + \Delta LTDB_t + \Delta ONCLI_t + \Delta CULI_t.$$

Using the above equations we can rewrite difference $CE_t - CF_t$ as

$$\begin{aligned} CE_t - CF_t &= \Delta FIAS_t + DEPRE_t - PL_t - DEPRE_t + \Delta CUAS_t - \Delta CULI_t \\ &= \Delta FIAS_t + \Delta CUAS_t - PL_t - \Delta CULI_t \\ &= \underbrace{\Delta CAPI_t + \Delta LTDB_t + \Delta ONCLI_t}_{=EFU_t(ExternalFinanceUse)} - \underbrace{(PL_t - \Delta OSFD_t)}_{=DIV_t(Dividends)} - \Delta CASH_t \quad (A-3) \end{aligned}$$

Term $\Delta CAPI_t + \Delta LTDB_t + \Delta ONCLI_t$ stands for the amount of equity raised/repurchased ($\Delta CAPI_t$) plus the amount of long-term debt issued/repaid ($\Delta LTDB_t$) plus the change in other forms of long-term financing ($\Delta ONCLI_t$). If a firm pays dividend (DIV), the corresponding change in other shareholders' funds is $OSFD_t - OSFD_{t-1} = PL_t - DIV_t$, and term $PL_t - \Delta OSFD_t$ in (A-3) is equal to dividends paid to shareholders. If a firm does not pay any dividends, $DIV_t = 0$, and the stock of cash does not change, $\Delta CASH_t = 0$, the difference between capital expenditure and cash flow from operations is equal to the amount of equity and long-term financing raised

$$CE_t - CF_t = \Delta CAPI_t + \Delta LTDB_t + \Delta ONCLI_t. \quad (A-4)$$

We define External Finance Use (EFU) as $\Delta CAPI_t + \Delta LTDB_t + \Delta ONCLI_t$ and we verify that equation (A-3) holds in our data when we use (A-1) and (A-2) to compute the left-hand side. We deviate from Rajan and Zingales (1998) to the extent that we scale EFU by total assets as of the beginning of each year ($TOAS_{t-1}$). The main technical reason is that capital expenditure is close to zero for many firms, which makes division difficult. We scale by total assets because it proxies for firm size and it is the measure that is the most comparable across firms in our sample.

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